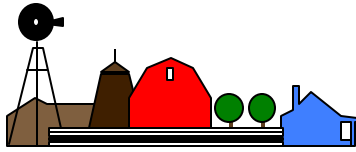


Sustainable Agriculture in the Mid-Atlantic States

Technical Note 1
February, 2000



Produced by the Mid-Atlantic IRT



**Natural
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Conservation
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What is Sustainable Agriculture?

There are many definitions of sustainable agriculture. The 1996 Farm Bill defines sustainable agriculture as an integrated system of agricultural production that satisfies several goals (see page 3). However, if we look at a typical conversation about sustainable agriculture, it usually leads to a discussion of whether sustainable agriculture means organic farming or not. However, as illustrated in the 1996 Farm Bill's definition, sustainable agriculture is not just another term for organic farming. The concept of sustainable agriculture is a means that uses the best techniques from several agricultural specialties that will help the farmer produce a viable product, while at the same time protecting and enhancing the environment. Therefore, under the umbrella of sustainable agriculture could be operations that are organic, or in transition from conventional agriculture to organic, or a farm that uses conventional methods in innovative ways to reduce pollutants and improve product quality and quantity.

Why do we need the term sustainable agriculture and a definition for it? Communication is a key component in sharing concepts and ideas of what works and what does not. In the past few decades there has been an explosion of producers and researchers trying new techniques in agricultural production to reverse the process of polluting our environment to a process of protection and improvement of the natural resources. So putting a title to a group of ideas and techniques makes it easier and more efficient to talk to one another and share successes as well as offer solutions to challenges.

When you look at the word sustainable, it can have a depth to it. What are we sustaining? What are we making last? What are we keeping going, like a perpetual motion machine? When we put the word sustainable with the word agriculture, then we narrow it down some. We want to sustain the environment, make it last. We want to sustain the farm itself to provide us with the necessities of life (food and fiber). We want to sustain the agricultural community, which includes things like marketing and quality of life. If farmers cannot produce a good quality product for a profit, their quality of life will suffer economically. And if farmers learn new or even old techniques that reduce the amount of chemical inputs, their health, their family's health, and their community's health may benefit. The quality of all these lives improves, along with the quality of life for the ecosystem itself.

What are some characteristics of a sustainable agriculture producer? They are willing to investigate

Note: Stefanie Aschmann, Agroecologist, NRCS Watershed Science Institute, published a Sustainability Technical Note 1 in Oct. 1997 for national use by NRCS. This gave an introduction to sustainable agriculture, as well as four case studies of farms from across the country. Here, in the Mid-Atlantic area of the East Region, the Technical Advisory Group for the Mid-Atlantic Inter-disciplinary Resource Team (IRT) felt it would be beneficial to publish technical notes using farms in this region.

The goal of this "Technical Note 1" is to give a brief overview of sustainable agriculture, and then highlight an innovative farming operation (case study). The audience targeted is our farming clientele, as well as our own field staff who work with agricultural producers. A second technical note highlighting a different farm is forthcoming.

This technical note is a product of team effort. Virginia Kopp and Letitia Toomer of the Virginia State Office interviewed the owner of Poly Face Farms and wrote the case study. Janet Graham of the Mid-Atlantic IRT wrote the introduction on sustainable agriculture, and is in charge of editing, publication and distribution. For more information, contact Janet Graham, Ecological Agronomist, NRCS-IRT, 1203 College Park Dr., Suite 101, Dover, DE 19904. Tel: 302-678-4178, Fax: 302-678-0843, email: janet.graham@de.usda.gov

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a new technique, analyze if it will fit into their program, and test it out before making a full commitment. They are business-oriented. For if they do not take care of the business end of the operations, they will not “sustain.”

These agricultural innovators are not afraid to be pioneers, heading towards a new “territory” in agricultural management. Some of them just quietly go about their business, pleased with their lifestyle and their contribution to society. Others are leaders in the community, speaking at conferences and networking with researchers. But the main component that seems to stand out is that they all have an open mind. And they diversify their operations so they will survive the up and down cycles by always having something to bring in an income when other areas stagnate for a bit.

The future seems brighter for those in the sustainable agriculture realm. Below is a list of resources available to obtain assistance and information about sustainable agriculture:

1. Programs like the USDA Sustainable Agriculture Research and Education Program (SARE) offer grant money for producers to try innovative techniques. The SARE program also offers grants to researchers to study alternative methods and disseminate the information to producers. See <http://www.sare.org/> for more details.

2. With the advent of the World Wide Web, there's an abundance of resources available, such as forums to ask technical questions to other producers who “have been there,” as well as web sites with research data. The Web can also provide a network of support even if the farmer is in a remote area.

Example: The SuperMarket, an online network to link farmers. It is a project of the Rural Coalition, a culturally diverse alliance with groups from the US and Mexico. The SuperMarket can be found at <http://www.ruralco.org> (FresnoBee, July 22, 1999, P1 Business, “Farmer to Farmer” by Dennis Pollock).

3. Not only is sustainable agriculture being supported within USDA's landowner assistance programs, but also by the USDA's executive branch:

a. An executive order was issued in 1993: The President's Council on Sustainable Development (see the sidebar).

b. A Sustainable Agriculture Working Group was established in August 1995 to identify USDA's barriers and opportunities to achieving sustainable agriculture which recommended a USDA-wide statement of commitment to sustainability concepts and establishment of a coordinating mechanism, such as a council to facilitate implementation of USDA efforts in sustainable development.

c. On July 9, 1997, Secretary Glickman implemented Departmental Regulation No. 1043-43 establishing the National Commission on Small Farms to gather and analyze information regarding small U.S. farms and ranches and recommend a national strategy to ensure their continued viability. It includes Policy Goal 6: Emphasize Sustainable Agriculture as a Profitable, Ecological and Socially Sound Strategy for Small Farms.

4. And last but not least, the public is becoming more educated in the value of quality farm products, thereby increasing the demand.

Example: The organic foods and beverages market grew more than 26 percent to \$4.5 million in 1997 (The Land Stewardship Letter, Nov. 1998, page 5).

President's Council on Sustainable Development (PCSD)

Formed by Executive Order in 1993, PCSD advises the President on sustainable development. The PCSD focuses on forging consensus on policy, demonstrating implementation, making the public aware of policy, and evaluating and reporting national progress.

Some Guiding Principles from the PCSD:

Sustainable Agriculture — USDA supports the economic, environmental, and social sustainability of diverse food, fiber, agriculture, forest, and range systems.

Sustainable Forestry — USDA balances the goals of improved production and profitability, stewardship of natural resources and ecological systems, and enhancement of the vitality of rural communities.

Sustainable Rural Community Development — USDA integrates these goals into its policies and programs, particularly through interagency collaboration, partnerships and outreach.

For general information about Sustainable Development@ USDA, call (202) 720-5447 or send e-mail to rbridge@oce.usda.gov. You may e-mail any technical questions or comments:

smallfarmsweb@fns.usda.gov.

URL: <http://www.usda.gov/oce/sdsf2/sdhome.htm>

Research Priorities of Organic Farmers

Based on the "Third Biennial National Organic Farmers' Survey," Organic Farming Research Foundation, 1999.

What needs do sustainable agriculture producers have with regards to their operations? Even though we are saying organic farmers are only part of the population of sustainable agriculture producers, a recent survey voicing their concerns could probably be echoed by others in the sustainable agriculture realm.

Over 4,500 certified organic farmers were surveyed in 1997 and 1998, with a response of 1,192 surveys returned. Farmers ranked a list of research topics; however, a more important part of the survey included allowing the farmers to write in their own words their top research priorities. The results are as follows:

- Weed controls
- Whole farm planning/design/ecosystem integration/permaculture
- Applied organic fertility management
- Nutritional quality in relationship to growing practices

As we introduce case studies of sustainable agriculture operations in the Mid-Atlantic through technical notes, a goal is to share how farmers are addressing areas of concerns such as those listed above, and to possibly inspire those who read these notes to pursue carrying out on-farm research instead of waiting for others to follow through.

There is a publication put out by the SARE program entitled "How to Conduct Research on Your Farm or Ranch," which can be obtained through the Northeast Region SARE office, Hills Building, University of Vermont, Burlington, VT 05405-0082, phone 802-656-0471, email: nesare@zoo.uvm.edu.

Sustainable Agriculture is defined in the 1996

Farm Bill as: "... an integrated system of plant and animal production practices having a site-specific application that will, over the long term-

- a. satisfy human *food and fiber needs*;
- b. enhance *environmental quality* and the natural resource base upon which the agricultural economy depends;
- c. make the most *efficient use* of nonrenewable *resources* and on-farm resources and integrate, where appropriate, natural *biological cycles* and controls;
- d. sustain the *economic viability* of farm operations; and
- e. enhance the *quality of life* for farmers and society as a whole." (16 U.S.C. Sec. 3103(17))

Other Related Definitions

1. **Soil Quality:** "... The fitness of a specific kind of soil to function within its surroundings, support plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation." Soil Quality-Introduction, Soil Quality Information Sheet, NRCS-Soil Quality Institute, April 1996.

2. **Precision Agriculture:** "... A technique that uses satellite technology to make precise adjustments in the application of fertilizers, pesticides and herbicides." Dr. Robert Lippert, Clemson University, SC, <http://www.reeusda.gov/success/impact97/arvc/sc-1b>.

3. **Permaculture:** "... The use of ecology as the basis for designing integrated systems of food production, housing, appropriate technology, and community development." The Permaculture Activist, Permaculture Drylands Institute, Autumn 1989.

4. **Biodynamics:** "... A science of life-forces, a recognition of the basic principles at work in nature, and an approach to agriculture which takes these principles into account to bring about balance and healing. Based on perceptions of Rudolf Steiner, an Austrian philosopher and scientist who lived at the turn of the century." An Introduction to Biodynamic Agriculture, Stella Natura, 1995.

5. **Organic Farming:** "... A production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators, and livestock feed additives... the systems rely upon crop rotations, crop residues, animal manure, legumes, green manures, off-farm organic wastes, mechanical cultivation, mineral-bearing rocks, and aspects of biological pest control to maintain soil productivity and tilth, to supply plant nutrients and to control insects, weeds and other pests." USDA Report and Recommendations on Organic Farming, 1980.



CASE STUDY:

This case study is organized into headings that follow the components of the definition of sustainable agriculture found on page 3.

Polyface Farms, Inc.

Owner: Joel and Theresa Salatin

Location: Augusta County, Virginia

Farmed Acres:

Pastureland 95, Woodland 455

Enterprises:

Cow/calf, chickens (layers and broilers), pigs, rabbits, turkeys and pheasants, grapes, fruit orchard and firewood.

Resource Issues:

Rotational Grazing /Pasture Improvement
Disease Control
Nutrient Cycling
Woodlot Management

Socioeconomic Goals:

Niche marketing
Income stability (year around income)

NRCS District Conservationist:

Robert N. Whitescarver
4801 Lee Hwy., USDA Bldg.
P.O. Box 70
Verona, VA 24482-0070
Tel: (540) 248-4328, Fax: (540) 248-3723



The Salatin Family: Theresa, Joel, Rachel, Daniel (from left to right).

Site Description:

Hemmed in between the Blue Ridge Mountains on the west and the Appalachian Mountains on the east, Augusta County suffers a snowy, cold winter. Average annual snowfall is 28".

Residents are rarely buried in snowdrifts because periodic thaws prevent snow from accumulating except in shadowed coves. However with winter temperatures averaging 34°F with daily minimums at 24°F, coats, hats and mittens are highly recommended.

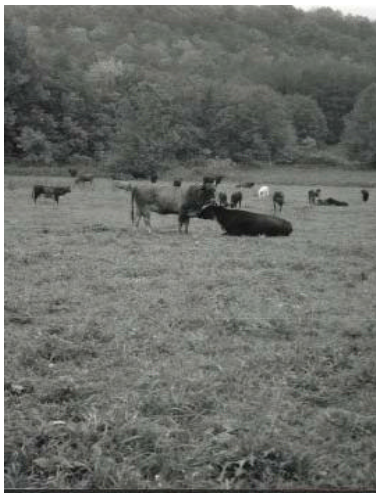
Summer temperatures are fairly warm on the upper slopes and can get very warm to very hot in the valleys with daily maximums at 84°F. Average summer temperatures are a balmy 72°F.

Rainfall is fairly evenly distributed throughout the year with the annual average being 34". Slightly more than half the rain falls from April through September. Heavier rainfall is seen on the windward, west-facing slopes than in the valleys. Heavy rains and severe summer thunderstorms cause periodic flash flooding in streams. Humidity ranges throughout the day from 80% in the pre-dawn hours to 50% at midday.

Soils on this gently sloping to steeply rolling landscape are naturally fertile, formed in the residuum of limestone, dolomite and calcareous shales. Edom silt loam and Chilhowie silty clay loam are well suited to pastures and hayland farming. Low organic matter content and moderate to high erosion potentials are the main concerns and these can be improved with proper stocking rates and rotational grazing practices. Interspersed with these fertile soils are some not so suited to farming such as Buchanan fine sandy loam, which contains a fragipan (a naturally occurring cement-like compaction of soil); the erosive and droughty Chilhowie shaly silty clay loam; and a Rock Outcrop-Frederick complex that contains sinkholes.

Introduction to Polyface Farms:

Joel and Theresa Salatin, with the help of their two children, Daniel and Rachel, display a level of sustainable management and organic farming that few farmers achieve. Joel's knowledge of nutrient cycles, soil chemistry, animal husbandry, pasture management and horticulture is encyclopedic. His father purchased the farm in 1961 and was a charter subscriber to Organic Gardening and Farming magazine. The family's management style works with natural principles rather than against them.



"Salad Bar Beef."

Satisfying Food/Fiber Needs:

The main product on the farm is referred to as "Salad Bar Beef." Cows are grazed and finished on pastures of diverse grasses, clovers, and native forages not unlike a salad bar. This industry is supported by pastured poultry (layers, broilers, turkeys and pheasants) and pastured rabbits. Table grapes and a fruit orchard are recent additions. Firewood and pigs are other farm products.

Enhancing Environmental Quality & Making Most Efficient Use of Resources and Natural Cycles:

Maintaining improved pastures is the primary concern on the farm. Rather than using traditional pasture improvement methods, a

more earth-friendly, low-technology method was used. Beginning more than 30 years ago when Joel's father purchased the farm, and continuing through today, the following system improves pasture productivity and grazing diversity without the use of commercial fertilizers, heavy equipment or intense labor. Moveable electric fencing, however, is absolutely necessary.

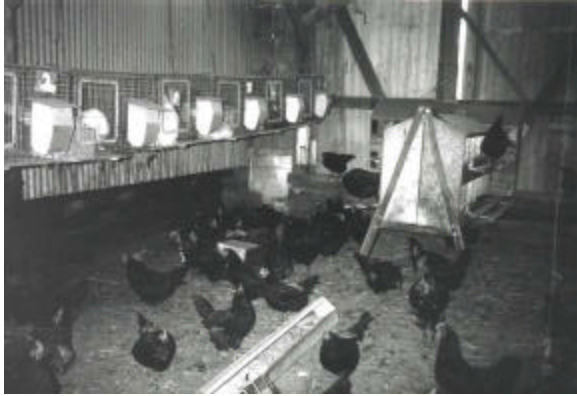
Cows are rotated daily on pastures just large enough to accommodate the herd. The size of the pastures is dependent on the quality and quantity of forage available and vary in size from around 1/3 of an acre to about an acre. An "eggmobile," a chicken house on wheels, is rolled into the pastures disgorging broilers or layers into the grazed pasture. The hens' job is to scratch through the cow patties consuming parasite eggs, heel fly larvae and other pests. This disperses manure piles, adds some high nitrogen fertilizer from the hen's droppings, and allows the pasture to be "self-composted."



Eggmobile in action in the pasture.

Within a short period of time grasses and legumes more suited to livestock palatability overtook the broom straw and other weeds. Pasture renovation is completed without seeding, artificial fertilizer or lime. This type of "stacked" management is practiced throughout the farm.

Stacked management is a technique where two or more products are managed on the same piece of land without degrading the resources. Efficiency, economy and sustainability are the benefits of such an intensive management style.



Rabbits and Chickens in the Hen House.

Here is another example of stacked management: The rabbit industry is managed by Daniel, who started his farming at the age of seven (he is now a teenager). Brood rabbits are placed in cages that are hung about three feet off the ground in the hen house. Underneath the cages are layers, providing a second income from their eggs. The floor is covered with sawdust and just like in the pastures, the hen's job is to scratch the ground thereby incorporating the rabbits' and hens' waste into the developing compost. The composted soil is spread on pastures just before spring and fall growth periods.



"Biniary."

Young rabbits are raised until they are weaned and after about a year they are moved into a "biniary" (bunnies + vineyard + aviary). There are four quadrants divided on this ¼ acre fenced pasture. Chicken wire is supported by black locust poles harvested from the abundant woodland.

Protected from the rabbits but within the pasture are vines for seedless table and Concord grapes. The quadrants are grazed by the nocturnal

bunnies and diurnal pheasants eliminating competition between them. Both rabbits and pheasants are moved throughout the four quadrants. And, of course, the whole system is moved on an annual basis.

Some rabbits are located inside a small, newly-planted fruit orchard of apples and plums. The small trees are protected from the rabbits which graze the grass around them, thereby eliminating the need for mowing. In the winter the rabbits and layers are relocated to a hoophouse to stay warm. In the spring when the animals are released back outside, the bedding is planted with vegetables, which can use a head start in this relatively cool, late spring climate.

Except for beef and pork, all meat processing is completed on the farm. Wastewater from processing is pumped to the biniary for the grapevines. Offal and carcasses are composted with wood chips and the resulting "natural fertilizer" is spread throughout the pastures.



Winter Hay Shed.

One of the most unique designs on Joel's farm is the winter hay shed. Cows spend the coldest part of the winter in this covered, open-walled barn, eating through an unusual feeder gate that is raised up as the bedding increases in size. Keeping a high carbon base with wood chips, manure and urine are composted as the bedding thickens.

When the cows are released into spring pastures, pigs are brought in to rummage through the compacted bedding that has been "seeded" periodically with barley and corn. Once the pigs have aerated the bedding, they are sold and the compost is spread onto the pastures. You would think that this enclosed environment would emit overpowering fumes, but as in all of Joel's enclosures, there is no odor. He buys wood chips and saw dust from loggers and wood mills to keep the carbon/nitrogen ratios high, which eliminates odors through continuous composting.

Improving processes and management is a continuing activity on Polyface Farm. Every year Joel adds to or changes his equipment or management. He stays informed about new ideas by contacting like-minded farmers from all over the world and will adapt new technology once he finds a use for it. This year it was a new type of fencing called "Feathernet" that combines the practicality of chicken wire with the portability and light weight of electric fencing. This product was developed in Australia. This light weight, electric, portable fence is used for his pastured chickens. Notice that once again portability and flexibility is used for increasing farm efficiency.

Sustaining Economic Viability:

In addition to environmental sustainability, Joel Salatin's farm is also a model of economic sustainability. The Salatin farm is a family operation. Labor for production activities and administrative tasks for day-to-day operations are supplied by Mr. and Mrs. Salatin and their children. Mr. Salatin has layered a number of agricultural enterprises based on integrated environmental, production and marketing considerations. In doing so, he has achieved an admirable level of economic efficiency.

Reducing Overhead and Labor Costs

Reducing overhead and labor costs is an important idea behind the Salatin's management strategy. Everything is portable, from the electric fencing, to the watering facilities, to the mobile cages for hens, rabbits, turkeys and

pheasants, even the biniary. Most cages are designed for one person to move by themselves, although a small tractor is used to move the eggmobiles. The eggmobiles contain their own feed boxes and watering troughs. All one has to do is connect the watering hoses to the troughs. All watering in pastures is gravity-fed off a well-designed pond located nearby at a higher elevation on the farm. Hay is stacked in a specially designed barn that houses the cows in winter. Winter feeding is completed in 10 minutes by tossing square bales to the feeding area.



Pastured Turkeys.

Variable costs that are typically major expenditures on traditional operations are minimized or eliminated on the Polyface Farm. Machine operation costs (labor, fuel and repair) are minimal. The tractor's main function is manure and compost spreading. Mr. Salatin does not buy fertilizer because he uses the nutrient-rich cattle and chicken manure. He also saves on chemical inputs by using natural predation to eliminate insects and weeds. In addition to minimal variable costs, materials for some of the construction come from Joel's own premises.

Mr. Salatin does purchase some inputs from other sources. Those items include fuel, wood chips, sawdust and poultry feed. The electric movable fencing for rotating cattle was also an import.

Year-round Income Through Diversity

With well-planned production inputs, Polyface Farm generates beef, broilers, eggs, turkeys and rabbits. Based on Mr. Salatin's estimates, these enterprises generate the following annually:

Enterprise	Gross/Acre Income
Cattle	\$ 300
Broilers	\$3,000
Turkeys	\$1,500
Eggmobile Eggs	\$ 135
Feathernet Eggs	\$2,500
Rabbits	\$4,500

Niche Marketing Strategies

Joel Salatin has capitalized on the concept of niche marketing. Specialty retail outlets have upscale clientele. These customers appreciate better quality beef and broilers that have a more desirable nutritional profile. This clientele also appreciates specialty meats like pheasants and rabbits. Discerning outlets pass the costs for premium meats on to their equally discerning customers. Products sold on the farm go to local families and restaurants.



Other Products

Mr. Salatin's journalism efforts relating to agriculture also add income to their business. He is an accomplished writer with two popular books, "Salad Bar Beef" and "Pastured Poultry Profits," and a third entitled "You Can Farm."

Overall

These farm enterprises are more like a system, as they are all interconnected by generating several products from each section of the farm.

Because the system is environmentally managed, productivity on the Salatin Farm will not diminish because of overused or abused natural resources. Polyface Farms has achieved environmental and economic balance.



Quality of Life:

Polyface Farm, Inc. (the farm of many faces) is successful because of the unique combination of technology, management, marketing, innovation and energy of the owner. Joel's timesaving techniques allow him to spend a lot of time traveling around the state sharing his expertise, as well as enjoy his family, and pursue his writing endeavors. Who knew that grass-based farming could supply so much?

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